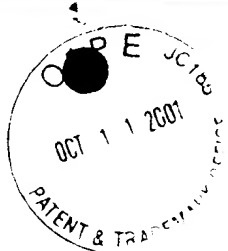


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is formed on the shielding layer. Alternatively, both layers may be patterned simultaneously. This is followed by the formation of wiring layer 310. In all cases, the shielding layer 40 forms a regular array of transparent portions divided by non-transparent shielded portions. Further, the non-transparent portions are aligned in good optical register with the sections of the circuitry layer 30 that it is desired to shield from optical radiation. In particular, excellent optical alignment with the active silicon layer 302 is possible.

The shielding layer 40 may comprise a reflective material that scatters light back toward the light source, or it may comprise a non-reflective light absorbent material. Where a non-reflective material is used it is desirable that this material be a relatively good thermal conductor, and that the shielding layer 40 be thermally coupled to a heat sink. Another option is to allow the shielding elements to provide the function of the black matrix.

Three particular examples will now be described to illustrate the preferred embodiments of the present invention.

Silicon nitride can be deposited on an underlying substrate using either Plasma Enhanced Chemical Vapor Deposition (PECVD) or a Low Pressure Chemical Vapor Deposition (LPCVD) process. Typically LPCVD silicon nitride is deposited using either a DCS/NH<sub>3</sub> or SiH<sub>4</sub>/NH<sub>3</sub> gas source at between 700-850 °C. A typical PECVD silicon nitride

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is deposited using a combination of  $\text{SiH}_4/\text{N}_2\text{O}/\text{NH}_3$  gas sources at between 300-400 °C .

Silicon dioxide ( $\text{SiO}_2$ ) can either be grown or deposited on the underlying substrate. Silicon dioxide can be thermally grown on a silicon substrate using either a dry oxidation ( $\text{O}_2$  only) or a wet oxidation ( $\text{H}_2\text{O}_2 + \text{O}_2$ ) at temperatures typically between 800-1100 °C. In the case of deposited oxides, techniques such as PECVD, LPCVD or Atmospheric Pressure Chemical Vapor Deposition (APCVD) can be used. PECVD would typically use a  $\text{SiH}_4$  gas source at temperatures between 300-400 °C. LPCVD uses TEOS/ $\text{O}_2$  at temperatures of 600-800 °C, or  $\text{SiH}_4/\text{O}_2$  at lower temperatures. APCVD would use a  $\text{SiH}_4/\text{O}_2$  gas source at temperatures between 350-500 °C.

Tungsten silicide is typically deposited by Chemical Vapor Deposition using  $\text{WF}_6$  and either  $\text{SiH}_4$  or DCS. Titanium (Ti) and Titanium Nitride (TiN) films are typically deposited by Physical Vapor Deposition (PVD) from a suitable metal target in ultra high vacuum .

While the invention has been particularly shown and described with reference to the preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made without departing from the spirit and scope of the invention.

What is claimed is: